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Research Article

Knowledge and Attitudes towards Infant Hearing Loss among the Midwives Working in Kalmunai, Sri Lanka

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Abstract

Background and Objectives: Infant hearing loss is the most prevalent congenital sensory disability posing significant linguistic, socio- emotional, educational and vocational consequences not only to the affected individual, but also in terms long term societal costs (Joint Committee on Infant Hearing, 2007). Therefore, the childhood deafness/infant hearing loss need to be diagnosed as early as possible. Midwife is one of the health care professionals responsible for promoting the health of community in Sri Lanka. Midwives can play a vital role in the early hearing detection and intervention process. Due to that, the study focused to evaluate the knowledge and attitudes towards infant hearing loss among midwives.

Methodology: A descriptive cross-sectional study design was implemented on public health midwives working in Medical Officers of Health (MOH) offices under Kalmunai Regional Director of Health Services (RDHS) in Sri Lanka. Purposive sampling method was used to recruit the sample. A self-administered questionnaire which was developed by reviewing previous studies on knowledge and attitude toward infant hearing loss and early intervention among midwives and/or health care professionals was used to collect the data.

Results: Data gathered from 90 midwives demonstrated overall lack of knowledge regarding the risk factors of hearing loss, Newborn Hearing Screening and follow up practices. However, their attitudes towards infant hearing loss were significantly positive.

Conclusion: There is a need to take urgent effort to educate the midwives awareness programs for better implementation of new born hearing screening and prepare the midwives to be an active member in Newborn Hearing Screening program for counselling and educating parents and explaining importance of early identification intervention to parents.

Keywords: Infant Hearing Loss; Newborn Hearing Screening; Knowledge; Attitude; Risk Factors; Midwives; Health Care Professionals

Abbreviations

UNHS: Universal New born Hearing Screening; EHDI: Early Hearing Detection and Intervention; CMV: Cytomegalovirus; JCIH: Joint Committee of Infant Hearing; NHS: New born hearing Screening; NHSP: New born hearing Screening Program; EHDIP: Early Hearing Detection and Intervention Program; ENT: Ear, Nose and Throat; MOH: Medical Officers of Health; RDHS: Regional Director of Health Services; NICU: Newborn Intensive Care Unit; IHL: Infant Hearing Loss

Introduction

Hearing is one of the primary senses which help us to communicate smoothly with the world. Unfortunately, the sense of hearing is often being kept neglected and people usually fail to realize its importance unless it is diminished or lost [5].

Infant hearing loss, the most prevalent congenital sensory disability posing significant linguistic, socio- emotional, educational and vocational consequences not only to the affected individual, but also in terms long term societal costs [19,20]. However, the negative consequences can be minimized or prevented through early identification and intervention [4].

The implementation of the Universal New-born Hearing screening (UNHS) and Early Hearing Detection and Intervention (EHDI) programme can decrease the mean age of identification of hearing impairment and maximize linguistic competence and literacy development for children with hearing loss [19,20].

The JCIH position statement emphasize that, all infants should have access to hearing screening before one month of age. Those who do not pass the initial hearing screening and the subsequent rescreening should have appropriate audiologic and medical evaluation to confirm the presence of hearing loss before 3month of age and who confirmed with permanent hearing loss should receive intervention services before 6 months of age [19].

The objective of the NHS is to enable the diagnosis of hearing impairment at a younger age and thus allow any necessary treatment and rehabilitative care to occur earlier. Early diagnosis poses new challenges, not only for the medical groups involved but also for those involved in the early support of the children concerned [6]. A successful NHS program involves the active participation of several health care professionals (physicians, paediatricians, neonatologists, midwives, nurses, and audiologists). This active multidisciplinary team creates the backbone for the successful implementation of NHS program. The primary medical care team including physicians, paediatricians as well as the nurses are mainly involved in referral and ensuring a proper follow-up [13].

Up to3 per 1000 infants are born with a permanent severe to profound hearing loss, making hearing loss one of the most common birth defect [1]. Hearing loss in the paediatric population can be caused by a number of factors that are classified as either genetic or environmental. Environmental causes of hearing impairment include prenatal, perinatal and postnatal complications. Prenatal factors are including intrauterine infections such as cytomegalovirus (CMV), herps, simplex virus, complication with Rh factor (wherein maternal antibodies affect the Rh-positive blood cell of the baby), maternal diabetes toxaemia and exposure to radiation. Perinatal complications, such as prematurity, low birth weight, hyperbilirubinemia requiring exchange transfusion, pharmacologic ototoxicity; and postnatal factors including bacterial meningitis and chronic otitis media with effusion, head injury, chicken pox, mums and noise exposure due to prolonged incubation [1,19].

Hearing loss can be categorized to the corresponding components of the affected auditory pathway. The primary categories of hearing loss include conductive, sensorineural, auditory neuropathy spectrum, central, and mixed. And hearing loss can be described by the degree of hearing loss: normal, mild, moderate, severe, and profound. The configuration of the hearing loss describes the degree of hearing loss at various frequencies. These configurations include low frequency, mid frequency, high frequency and flat (essentially equivalent at all frequencies). Other common descriptors of hearing loss are: bilateral versus unilateral; symmetrical versus asymmetrical; progressive versus sudden; fluctuating vs stable; pre lingual vs post lingual; congenital, late onset or acquired [1].

If an infant hearing loss do not address as early as possible it will impact on language development, it also has an impact on literacy, self-esteem and social skills. Untreated hearing loss is often associated with academic achievement, which can lead to reduced employment opportunities later in life. Communication difficulties can have lasting emotional and psychological consequences that can lead to feelings of isolation, loneliness and depression. And also, the untreated hearing loss also effects later on their social development with communities [2].

Midwife is one of the health care professionals responsible for promoting the health of community in Sri Lanka. Midwives can play a vital role in the EHDI process. They can provide counselling and education to mothers during pregnancy and in the postnatal period about the new-born hearing screening, screening techniques, the protocol for referrals, and the improved outcome of infants who are identified with hearing loss during the new-born period [1]. Midwives can collaborate with health care professionals. They can provide valuable information on motor, sensory and language developmental milestones and form a crucial emotional support system for parents of diverse socio-economic and cultural backgrounds during the neonatal period [15].

In "National program for prevention of hearing impairment and deafness in Sri Lanka 2012- 2030" which was published by Minis-

try of Health, Sri Lanka, the role of public health midwives in EHDI process is mentioned. It includes, guiding parents/persons regarding the need and methodology of early identification and prompt intervention, provide information regarding the use of hearing aids, educational and livelihood opportunities for the hearing impaired population, referral to other professionals and upgrade their knowledge with respect to ear and hearing care, ear diseases and hearing loss [11].

Audiology is a newly developing allied health field in Sri Lanka. Even though there are facilities readily available in Sri Lanka to screen, diagnose and intervene hearing loss in neonatal period, hearing loss gets detected at later stage in many children causing a significant delay in speech and language development. A possible barrier preventing the early intervention of infants with hearing loss could be the lack of knowledge and negative attitudes on infant hearing loss screening and early intervention, and management options for child with hearing impairment among the health care professionals. Also, there is no literature regarding the knowledge and attitudes of infant hearing loss in Sri Lankan context among health care professionals. Therefore, the need is felt to explore the knowledge and attitudes of infant hearing loss among midwives in Kalmunai.

According to studies which were done in other countries, most of the health care professionals such as paediatricians, otolaryngologists, nurses, midwives and audiologists have shown a positive attitude while emphasizing the need to acquire additional information regarding early identification and intervention of infant hearing loss [4]. Therefore, this study may help to identify the level of knowledge and attitude regarding the infant hearing loss, early identification and intervention among the midwives in Kalmunai zone.

The study was explored to determine the knowledge and attitudes towards infant hearing loss among midwives in Kalmunai zone.

Methodology

A descriptive cross-sectional study design was implemented on public health midwives working in Medical Officers of Health (MOH) offices under Kalmunai Regional Director of Health Services (RDHS) in Sri Lanka. Purposive sampling method was used to recruit the sample (n = 90). After receiving ethical clearance from the Ethical Review Committee of Faculty of Medicine, Ragama, permission from the Regional Director of Health Services, Kalmunai and Medical officers of Health (MOH)s in Kalmunai was obtained. The consent forms along with the information sheets regarding the study were provided to the participants. If any participant is not willing to provide the consent she was not included to the study.

Data was collected by a self-administered questionnaire. The questionnaire was given in preferred language (Sinhala/Tamil/English). A questionnaire was developed by reviewing previous studies on knowledge and attitude toward infant hearing loss and early intervention among midwives and/or health care professionals. The questionnaire consisted of 3 parts: knowledge regarding risk factors of infant hearing loss, knowledge on identification, intervention and attitudes towards infant hearing screening and early intervention. These questions were consisted of closed-end questions: multiple choice and 3-point rating scale i.e. yes, no and not sure. Moreover, demographic characteristics such as, age, gender, educational level, and years of experience were included. Obtained data were recorded in the same questionnaire data collection sheet. And also the data was computerized.

Data analysis: Data gathered through questionnaire was analyzed quantitatively by using the SPSS (Statistical Package for the Social Sciences) version 22 software package descriptive statistics. All the questions in the questionnaire were analyzed individually according to the answers given to the each question and the frequency of the each answer is obtained for each question separately. Awareness was evaluated for whole population in each aspect according to the answers given. Their responses to each of the questions were assigned a scale of 0-2: wrong answer = 0; correct answer = 2; not sure = 1; and were analyzed descriptively utilizing measures of frequency distribution, and percentage of responses. Before evaluating the association between the knowledge and attitudes, the scores of each participant for knowledge and attitude were obtained separately and then changed into percentage due to keep same denominator of Knowledge and Attitudes' score. Then the data was examined by using Spearman's correlation.

Results

A total of 104 questionnaires were distributed, and 90 were collected indicating a response rate of 87%.

The table 1 illustrates information about a summary of the demographic characteristics including age, educational level and year of working experiences with participants' distribution in frequency and percentage. Age of all participants was categorized into 5 groups. The majority of participants were 30 - 39 years (54%) and least number of participants was from 20 - 29 years group (4.4%). Further, the majority of participants educational level was A/L (91.1%). Approximately 35.6% of midwives had 11 - 15 years of work experience and least number of participants (2.2%) had above 25 years of work experience.

Characteristics	Frequency (N = 90)	Percentage (%)
Age		
20 - 29 years	4	4.4
30 - 39 years	49	54.4
40 - 49 years	30	33.3
50 - 59 years	7	7.8
60/above 60 years	0	0.0
Educational Level		
O/L	4	4.4
A/L	82	91.1
Others	4	4.4
Year of Experience		
0 - 5 years	16	17.8
6 - 10 years	13	14.4
11 - 15 years	32	35.6
16 - 20 years	22	24.4
21 - 25 years	5	5.6
Above 25 years	2	2.2

Table 1: Demographic characteristics of participants.

Knowledge and attitudes towards infant hearing loss

Figure 1 shows a summary of the survey results the distribution of midwives" responses regarding their knowledge about risk factors of infant hearing loss.

Majority of the midwives knew that Infant Hearing Loss (IHL) can be caused by infection in the ear (90.0%), congenital defects (66.7%), consanguinity (58.9%), Syndrome e.g. Down syndrome (56.7%), maternal infections (53.3%) and neonatal meningitis

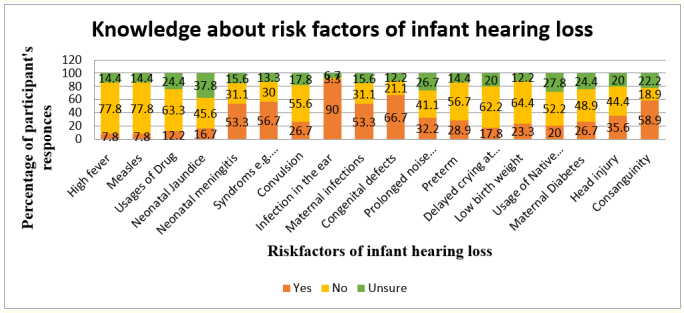

Figure 1: Midwives' knowledge about risk factors of infant hearing loss.

(53.3%). However, the less number of midwives know that IHL can be caused by head injury (35.6%), prolonged noise exposure e.g. baby in Neonatal Intensive Care Unit (NICU) more than 5 days (32%), preterm (28.9%), maternal diabetes (26.7%), low birth weight (23.3%), delayed crying at birth (17.8%), neonatal jaundice (16.7%), usage of drugs/medicines for instance:/ototoxicity (12.2%) and high fever and measles (7.8%). These risk factors were obtained as potential areas which has poor knowledge among midwives.

Knowledge of midwives about management options for infant with hearing loss

Figure 2 shows the information for six questions about knowledge regarding early identification and intervention of IHL.

Figure 2: Midwives' knowledge about identification and intervention of infant hearing loss.

94.4% of the midwives were aware about the treatment (e.g. hearing aids) for infant hearing loss. And, 91.1% of midwives knew the milestones regarding language, communication and hearing. 92.2% of midwives knew that there is no newborn hearing screening programme in their locality. More than half of the participants did not know that children with hearing loss can attend normal school and hearing impaired children can still hear and speak. 46.7% of midwives responded as "Yes" for the question "can hearing loss be identified soon after birth?" whereas 43.3% of participants were not aware about the hearing loss can identified soon after birth and 10% of participants reported as unsure about it.

Figure 3 shows the distribution of participants‟ responses for the question „what would be the ideal time to teach families about the newborn hearing including risk factors of hearing loss and newborn hearing screening.

Figure 3: Midwives' knowledge regarding the ideal time to teach families about newborn hearing.

Almost half of participants (57%) reported that perinatal period is the ideal time to teach about new born hearing including risk factors of hearing loss and newborn hearing screening, prenatal was reported 13% postnatal was reported 29% and 1% of participants reported as not sure about the ideal time to teach about new born hearing.

Responses of the participants are illustrated on figure 4 for the question "if you find a child with hearing problem, which professional do you refer to?" 73% of midwives reported ENT consultant for this question.

Attitude of midwives towards infant hearing screening and early intervention.

Table 2 shows the distribution of responses for questions eliciting attitudes towards infant hearing screening and early intervention. From the data, there is a significant positive attitude (100%)

Figure 4: Midwives' knowledge about professionals deal with hearing problem.

to learn more information regarding early detection and intervention of IHL. To the question related to how confident they are to explain the NHS process to parents who have questions about their infant's results, 100% of midwives reported negatively. 97.8% midwives positive to like to test a baby after birth for evaluating hearing sensitivity. And also, 78.9% midwives were positive for early treatment of hearing loss will prevent further complications and the universal newborn hearing screening is worth its cost. For the question 'do you think the newborn hearing screening program is essential for all newborns?' 56.7% midwives were positive, however, 43.3% were negative about it. The overall data represents that the midwives showed positive attitude infant hearing loss.

	Percentage (%)		
	Yes	No	Unsure
Would you like to test a baby after birth for hearing sensitivity?	97.8	2.2	0.0
Would you let a baby to use hearing aids if she/ he has hearing loss?	68.9	16.7	14.4
Do you consider early treatment of hearing loss will prevent further complications?	78.9	13.3	7.8
Do you think that universal newborn hearing screening is worth its cost?	78.9	10.0	11.1
Do you think the newborn hearing screening program is essential for all newborns?	56.7	43.3	0.0
Are you good at explaining the new born hearing screening process to parents who have questions about their infant's results?	0.0	100	0.0
Do you prefer to learn need more information regarding early detection and intervention of infant hearing loss?	100	0.0	0.0

Table 2: Midwives' attitudes towards infant hearing screening and early intervention.

Table 3 shows results of the difference between the midwives' knowledge and attitude regarding infant hearing loss Spearman's correlation coefficient was used to assess the association between knowledge and attitude regarding infant hearing loss. Results of the study show low positive correlation between scores of knowledge and attitude, which was statistically significant ($r_s = 0.311$, $p < 0.05$).

	n	Mean Score (%)	Minimum (%)	Maximum (%)	Std. deviation	Statistic	P value
Knowledge	90	43.25	19.23	79.92	15.94	r_s = 0.311	0.003*
Attitudes	90	71.11	42.86	85.71	13.54		

Table 3: Results of the difference between the midwives' knowledge and attitude regarding infant hearing loss.

*p < 0.05 hence, there was statistically significant between knowledge and attitude.

As seen in table 4, there is no association between midwives' knowledge with their year of working experience and attitudes with their year of experience because of p-values (p > 0.05).

Year of experience		0 - 5 years	6 - 10 years	11 - 15 years	16 - 20 years	21 - 25 years	Above 25 years
No of participants		16	13	32	22	5	2
Knowledge	St. deviation	10.9	10.4	16.1	20.75	9.8	10.87
	P-values	0.566					
Attitude	St. deviation	15.3	12.6	13.5	12.9	17.5	10.1
	P-values	0.824					

Table 4: Results of the association between midwives' knowledge and attitudes with their year of working experience.

Discussion

The present study was a first attempt at exploring the knowledge and attitude towards infant hearing loss among the midwives in Sri Lanka. Midwife is one of the health care professionals responsible for promoting the health of community. Midwives can play a vital role in the early hearing detection and intervention process. The study recruited midwives who work working in the field/having experience of field visit at Medical officers of Health (MOH) offices under Kalmunai Regional Director of Health Services (RDHS). The results have been discussed based on the different subsections of the questionnaire.

Existing knowledge on risk factors of hearing loss

In the current study, majority of the midwives (nearly 90.0%) knew that Infant Hearing Loss (IHL) can be caused by infection in the ear. Even though, there is significant awareness on IHL can be caused by infection in the ear, midwives' knowledge regarding other risk factors of IHL was lowest such as head injury (35.6%), prolonged noise exposure e.g. baby in neonatal intensive care unit (NICU) more than 5 days (32%), preterm (28.9%), maternal diabetes (26.7%), low birth weight (23.3%), delayed crying at birth (17.8%), neonatal jaundice (16.7%), usage of drugs/ medicines (12.2%) and high fever and measles (7.8%). Similarly, in a study by Sanju., *et al*. (2018) conducted for North India nurses, 71% were not aware of the fact that high fever can cause hearing loss, 70% were not aware regarding measles can cause hearing loss in infants and 85% were not are regarding neonatal jaundice can cause hearing loss in infants. Further, Mazlan and Min (2018) indicated that 78.3% of Malaysian health care professionals involve in newborn hearing screening program did not know prolonged noise exposure i.e. staying in NICU for more than 2 days. Overall findings of the present study indicate that there is a gap in knowledge regard to causes of infant hearing loss among midwives working in Kalmunai.

Childhood hearing loss impacts on language development, literacy, self- esteem, social skills, emotional and psychological behaviors and educational achievement later on his/her quality of life [2]. It connects with the knowledge of midwives' regard to risk factors of hearing loss. Poor knowledge of midwives may lead to delayed identification of infants who have risk to late onset of hearing loss and leads to delayed intervention to the child with hearing impairment.

And also, Midwife is one of the health care professionals responsible for promoting the health of community. Midwives can play a vital role in educating and counselling parents during prenatal and postnatal period about importance of infant hearing. The lack of knowledge of midwives may leads to reduce the parental knowledge regard to infant hearing loss. Therefore, there is a need to be further improvement in awareness percentage. Otherwise, midwives wait till an observable sign of hearing loss. On the other

hand, adequate awareness may prepare the midwives to have positive attitudes towards hearing screening and early intervention.

Existing knowledge on identification and intervention

Approximately 40% of midwives were not known that hearing loss could be identified soon after birth. These findings match with a study which was conducted in Northern India for nurses [5]. The most interesting finding was that 94.4% of midwives were aware that the treatments (e.g. hearing aids) are available for infant hearing loss. Compare to other studies which were done in other countries, midwives working in Kalmunai have high awareness on treatments for hearing loss i.e. studies from other countries indicated approximately 67% of the participants were aware of management for hearing loss [5].

By reviewing the results, it is surprising to note that 64.4% of midwives were not recognized that children with hearing impaired can attend to normal school and comparing with previous study [5] which was reported 48% of nurses did not know that children with hearing impaired can attend to normal school. It indicates midwives working in Kalmunai MOHs have poor knowledge on that hearing impaired children can have the same educational opportunities as their normal development peers.

Further, the familiarity of newborn hearing screening were very poor in midwives because 92.2% of midwives did know about NHS compared to other studies [4,13,15]. Another study reported that 88% of the nurses were unaware of that the fact children with hearing impairment can still hear and speak [5]. However, from the data of the current study showed that more than half of the participants (56.7%) did not know that hearing impaired children can have residual hearing and speak.

The most interesting finding was that 91.1% of midwives knew the milestones regarding language, communication and hearing. It will help to find out children with delayed in milestones regarding language, communication and hearing and provide appropriate intervention for the children.

The overall findings from the studies emphasize to increase awareness programs regard to importance of early identification and intervention of infant hearing loss and newborn hearing screening and role of midwives in NHS process.

Attitudes toward infant hearing screening and early intervention

Attitudes, not just knowledge, are important to promote changes in health care practices [9]. The results of the study indicates that the midwives were not confident in explaining about the new born hearing screening to parents. It can be attributed to do not implementation of newborn hearing screening program among midwives working under Kalmunai Regional Director of Health Offices. It should be important to have knowledge about hearing screening tests. Otherwise till the baby shows symptoms of hearing loss, parents will wait to test. It will cause to have some developmental delays. Therefore, NHS process helps in early identification of the hearing loss.

Beliefs about the importance of newborn hearing screening may be linked to midwives' clear understanding of the consequences for newborns with hearing loss on speech development, language acquisition, and learning. A clear understanding that even minimal hearing loss has consequences for the development of speech and language [10] will put midwives in a better position to guide families [4].

However, the majority of midwives (100%) showed a significant positive attitude to learn more information regarding early detection and intervention of IHL. And also, 97.8% midwives positive to like to test a baby after birth for evaluating hearing sensitivity. And also, 78.9% midwives were positive for early treatment of hearing loss will prevent further complications and the universal newborn hearing screening is worth its cost and 56.7% midwives were positive to the newborn hearing screening program is essential for all newborns.

Similar findings were found in other studies such as > 50% were positive to the universal newborn hearing screening is worth its cost [7,13,15], 69% - 98% were positive to the newborn hearing screening program is essential for all newborns [4,7,13,15] and 70% were positive attitude to learn more information regarding early detection and intervention of IHL [13]. On the other hand, one study indicated that poor attitudes on infant hearing loss [5]. These differences between the studies could be due to factors such as location of study, public awareness and experiences with NHS program.

Conclusion

The present study sheds light on the existing level of knowledge and attitudes towards infant hearing loss levels among midwives. Even though the midwives showed a significant knowledge regarding the risk factors of hearing loss such as infection in the ear, congenital defects, consanguinity, syndromes and maternal infections, there is certain gaps are evident such as prolonged nose exposure, maternal diabetes, delayed birth cry, jaundice, measles, high fever, low birth weight, head injury and convulsion. And, overall results indicated that poor knowledge on NHS and follow up practices. However, attitudes towards the infant hearing loss were significantly positive. And also, the present study finds that knowledge and attitudes of midwives do not depend on the year of experiences. Therefore, there is a need to take urgent effort to educate by continuing medical education programs, awareness programs for risk factors of hearing loss, consequences of delayed identification of IHL, role of midwives in newborn hearing screening programs and implementation of NHS program and prepare the midwives to be active member in NHS program for counselling and educating parents and explaining importance of early identification intervention to parents. And it will help to continue further similar studies in Sri Lanka among health care professionals.

Limitation of the Study

One of the major limitations of this study is, it was conducted using an self - administered questionnaire which was developed by the researcher for the purpose of the research due to there was no validated questionnaire regarding infant hearing loss and early intervention in Sri Lanka.

Second limitation of the study was there is no literature regarding the knowledge and attitudes of infant hearing loss in Sri Lankan context among health care professionals. Third limitation of this study was the participants of the study worked in several areas. Therefore, they could not together in one place within the data collection period. It was limited to collect data from estimated samples (104) of this study however, 90 were collected indicating a response rate of 87%.

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